What is claimed is:

1. A device for receiving a time varying input signal and for generating both an oscillating output signal and a mixed output signal, the mixed output signal representing a translation of the oscillating output signal, the device comprising:

(a) a differential pair of transistors for receiving the time varying input signal and for generating a differential pair output signal having a time varying input signal component and other signal components;

(b) a first filter network, operatively connected to the differential pair for receiving the varying input signal component from the differential pair, for generating a negative resistance across two nodes connected to the first filter network, and for selectively providing the oscillating output signal by providing an impedance across the two nodes; and

(c) a second filter network, operatively connected to the two nodes, for receiving the oscillating output signal, and operatively connected to the differential pair for receiving the other signal components, for generating and selectively passing the mixed output signal.

2. The device of claim 1, wherein the input signal has time varying and constant components.

3. The device of claim 1, wherein the magnitude of the negative resistance is proportional to the magnitude and frequency of the time varying input signal.

4. The device of claim 1, wherein the first filter network generates the negative resistance across nodes connected to the collectors of the differential pair of transistors.

5. The device of claim 1, wherein the second filter network includes means for generating the mixed output signal by translation of the oscillating output signal by the frequency of the time varying signal.

6. The device of claim 1, wherein the mixed output signal has a frequency equal to the frequency of the oscillating output signal plus the frequency of the time varying input signal.

7. The device of claim 1, wherein the mixed output signal has a frequency equal to the frequency of the oscillating output signal minus the frequency of the time varying input signal.

8. The device of claim 1, further comprising:

(d) a second differential pair of transistors for receiving a second time varying input signal, the second differential pair being operatively connected to the first and second filter networks for providing the second time varying input signal;

wherein the first filter network creates a negative resistance across two pairs of nodes in parallel with each other, and wherein the second filter network cancels output signals at the frequency of the oscillating output signal.

9. The device of claim 8, wherein the first and second time varying signals have time varying and constant components.

10. The device of claim 9, wherein the first and second time varying signals are out of phase with each other.

11. The device of claim 8, wherein the overall negative resistance of the parallel negative resistances is substantially constant.

12. The device of claim 8, wherein the first filter network is a high pass filter.

13. The device of claim 12, wherein the high pass filter is tuneable.

14. The device of claim 8, wherein the second filter network is a low pass filter.

15. The device of claim 8, wherein the first filter network is a low pass filter.

16. The device of claim 15, wherein the low pass filter is tuneable.

17. The device of claim 8, wherein the second filter network is a high pass filter.

18. The device of claim 10, further comprising a input staging circuit operatively attached to the differential pairs for providing the time varying input signals, the input staging circuit having a differential pair of transistors operatively connected to a constant

signal, a time varying signal and a biasing signal for generating the two out of phase time varying input signals.

19. A device for receiving a time varying input signal and for generating both an oscillating output signal, and a mixed output signal, the mixed output signal representing a translation of the oscillating output signal, the device comprising:

(a) first and second differential pairs of transistors for each receiving the time varying input signal and for each generating a differential pair output signal having a time varying input signal component and other signal components;

(b) a first filter network, operatively connected to the differential pairs for receiving the varying input signals from the differential pairs, for generating a negative resistance across two pairs of nodes connected in parallel to the first filter network, and for selectively providing the oscillating output signal by providing an impedance across the parallel negative resistances; and

(c) a second filter network, operatively connected to the two pairs of nodes, for receiving the oscillating output signal, and operatively connected to the differential pairs for receiving the other signal components, for generating and selectively passing the mixed output signal.

20. The device of claim 19, wherein the time varying input signals are out of phase.

21. The device of claim 18, wherein the first filter network is a tuneable high pass filter, and the second filter network is a low pass filter.